INFORMATION SHEET

ORDER NO. R5-2004-
U.S. DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE
LIVINGSTON STONE NATIONAL FISH HATCHERY
WINTER RUN REARING FACILITY
SHASTA COUNTY

FACILITY DESCRIPTION

The U.S. Fish and Wildlife Service (hereafter Discharger) operates the Livingston Stone National Fish Hatchery (also known as the Winter Run Rearing Facility and hereafter designated as the Facility) at 16349 Shasta Dam Boulevard in Shasta Lake, California. The Facility is located on Assessor's Parcel No. 065-510-01-11, ½ mile downstream of the Shasta Dam powerhouse and approximately 3 miles northwest of the City of Shasta Lake in Section 15, T33N, R5W, MDB&M, latitude N 40° 43' 00"and longitude W 122° 25' 26". The Facility is a salmon spawning/rearing operation that raises endangered winter-run Chinook salmon for release to the Sacramento River in Redding, California. The Discharger owns the site improvements and operates the hatchery. The U.S. Bureau of Reclamation previously owned the property however ownership is in the process of being transferred to the Discharger.

In its Report of Waste Discharge (RWD), the Discharger reported a total annual harvestable weight of Chinook salmon of 2,800 pounds and reported 1,003 pounds as the total weight of food fed during the month of maximum feeding (January). This facility does not meet the 20,000 pounds harvest weight or 5,000 pounds of food criteria, however, the Regional Board has designated the Facility as a cold-water, flow-through CAAP facility requiring an NPDES permit because of the chemical additives that are part of the waste stream.

The Facility consists of two 20-ft diameter wild brood stock holding tanks, thirty 16-ft by 3-ft 3-in rearing tanks (raceways), twenty 12-ft diameter brood stock tanks, and one hatchery building containing sixty fry circulars (30-inch diameter tanks for early rearing). Supply water is diverted to the Facility from the Shasta Dam penstocks and wastewater is discharged to the Sacramento River, a water of the United States. Supply water is aerated by packed towers and routed from a head tank to the hatchery building, wild brood stock tanks, and the rectangular and circular fish tanks. Discharge flow is estimated based upon the number of units in service and an estimated flow rate for each unit. According to monitoring data submitted by the facility from July 1998 through September 2003, the average total wastewater discharge was 1 million gallons per day (mgd) with a maximum of 2.45 mgd.

The Facility has four outfalls that discharge directly to the Sacramento River. Two outfalls are from the head tank (overflow and drain pipes). There are no effluent limitations required for discharges from these pipes because the Facility does not add constituents to the water, which would pass through from the Shasta Dam penstocks. Wastewater discharged from Outfall 001 and Outfall 002 and managed as follows:

Outfall 001: Wastewater from the hatchery building and the two wild brood stock tanks is discharged via Outfall 001 to the Sacramento River. When malachite green is used as a fungicide treatment for

the adult salmon in the wild brood stock tanks, the affected wastewaters are routed through two 2,000 lb granular activated carbon filters (GAC filters) operated in series. In addition, the Discharger routes water containing formalin (used to treat eggs for fungus infections) through the GAC filters prior to discharge. GAC filter effluent is then routed to Outfall 001. Reported flow values from July 1998 through September 2003 range from no flow to 0.84 mgd.

Outfall 002: Wastewater from the rectangular rearing and the circular brood stock tanks are discharged via Outfall 002 to the Sacramento River. Since March 2000, samples for Outfall 002 were collected from two locations because of safety considerations, and have been designated as Outfall 002A and Outfall 002B on self monitoring reports. Sample point 002A is representative of the flow from the rectangular rearing tanks, and sample point 002B is representative of flow from the circular tanks. Flows from 002A and 002B are combined in a large corrugated pipe prior to discharge (Outfall 002). Reported flow values from July 1998 through September 2003 range between no flow and 2.45 mgd discharged via Outfall 002 (total of 002A and 002B). The discharges from two of the circular brood tanks were modified in December 2000 to direct the flow through a series of ultraviolet (UV) sterilizers. Water passing through the UV system is returned back to the existing discharge pipe and released through discharge point 002B. The UV system is only used when these two tanks hold endangered adult winter Chinook salmon transferred from the Bodega Marine Lab or Steinhart Aquarium, due to concerns about a fish disease called Rosette Agent.

Domestic wastewater from the Facility is discharged to a septic tank/leachfield system.

Wastes generated at the Facility include fish fecal material, unconsumed fish food, nutrients, algae, silt, chemicals and therapeutic agents used to treat fish and control disease. Based on monthly monitoring reports for Outfall 001, Outfall 002A, and Outfall 002B from March 2000 to September 2003, effluent quality may be characterized as follows:

	Outfall 001			***Outfall 002A***			***Outfall 002B***		
Constituent	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Dissolved oxygen (mg/L)	13.2	9.2	11.7	13.5	9.7	11.8	14.2	9.7	11.8
Turbidity (NTU)	3.25	1	1.98	6	1.2	2.79	5.95	1.25	2.86
Temperature (^{o}C)	14.8	9.2	11.6	14.9	9.1	11.5	14.9	9.1	11.5
pH	9.34	6.37	--	9.16	6.45	--	9.1	6.55	--
Settleable solids (mL/L)	0	0	0	0	0	0	0	0	0
Total suspended solids (TSS)[1] (mg/L)	0.9	0.4	0.7	1.1	0.7	0.92	1.2	0.3	0.8

[1] TSS concentrations are net values (effluent concentration minus intake concentration)

Chemicals are used at the Facility to treat fish directly for parasites, fungi, and bacteria or to anaesthetize fish, and may be used to clean rearing raceways in order to reduce the spread of disease among the confined fish population. Chemicals currently used at the Facility include formalin (as a 37% formaldehyde, methanol-free solution) sodium chloride (salt), malachite green, povidone-iodine (Argentyne), chloramine-T, tricaine methanesulfonate (MS-222), carbon dioxide, Pond PolyAqua, vibrio vaccine, erythromycin (injected), and Luteinizing Hormone-Releasing Hormone analogue (LH-RH_a).

The following are used in the cryopreservation of sperm and as sperm activators. They are not discharged to surface waters, though trace amounts may remain on the eggs when they are placed in the incubator stacks, which flow to Outfall 001: glucose, dimethyl sulfoxide, chicken egg yolk, sodium chloride, trizma base buffer, glycine, and theophylline.

Chemicals not currently used by may be used in the future include oxytetracycline (Terramycin 100D and Liquamycin LA-200), SLICE (Emamectin benzoate), and Ivermectin.

APPLICABLE REGULATIONS, POLICIES, AND PLANS

A cold-water concentrated aquatic animal production (CAAP) facility is defined in Title 40 of the Code of Federal Regulations (40 CFR 122.24) as a fish hatchery, fish farm, or other facility which contains, grows, or holds cold-water fish species or other cold-water aquatic animals including, but not limited to, the Salmonidae family of fish (e.g. trout and salmon) in ponds, raceways, or other similar structures. In addition, the facility must discharge at least 30 calendar days per year, produce at least 20,000 pounds harvest weight (9,090 kilograms) of aquatic animals per year, and feed at least 5,000 pounds (2,272 kilograms) of food during the calendar month of maximum feeding. A facility that does not meet the above criteria may also be designated a cold water CAAP facility upon a determination that the facility is a significant contributor of pollution to waters of the United States [40 CFR 122.24(c)]. Cold-water, flow-through CAAP facilities are designed to allow the continuous flow of fresh water through tanks and raceways used to produce aquatic animals (typically cold-water fish species). Flows from CAAP facilities ultimately are discharged to waters of the United States and of the State. 40 CFR 122.24 specifies that CAAP facilities are point sources subject to the National Pollutant Discharge Elimination System (NPDES) program. This facility does not meet the 20,000 pounds harvest weight or 5,000 pounds of food criteria, however, the Regional Board has designated the Facility as a cold-water, flow-through CAAP facility requiring an NPDES permit because of the chemical additives that are part of the waste stream.

The operation of CAAP facilities may introduce a variety of pollutants into receiving waters. The U.S. Environmental Protection Agency (USEPA) identifies three classes of pollutants: (1) conventional pollutants (i.e., total suspended solids (TSS), oil and grease (O&G), biochemical oxygen demand (BOD), fecal coliforms, and pH); (2) toxic pollutants (e.g., metals such as copper, lead, nickel, and zinc and other toxic pollutants; and (3) non-conventional pollutants (e.g., ammonia-N, Formalin, and phosphorus). The most significant pollutants discharged from CAAP facilities are

solids from uneaten feed, as well as fish feces that settles to the bottom of the raceways. Both of these types of solids are primarily composed of organic matter including BOD, organic nitrogen, and organic phosphorus.

Fish raised in CAAP facilities may become vulnerable to disease and parasite infestations. Various aquaculture drugs and chemicals are used periodically at CAAP facilities to ensure the health and productivity of the confined fish population, as well as to maintain production efficiency. Aquaculture drugs and chemicals are used to clean raceways and to treat fish for parasites, fungal growths and bacterial infections. Aquaculture drugs and chemicals are also used to anesthetize fish prior to spawning or prior to the annual "tagging" process. As a result of these operations and practices, drugs and chemicals may be present in discharges to waters of the United States or waters of the State.

In August 2004, USEPA promulgated Effluent Limitation Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category (hereafter "ELG"). The ELG regulation establishes national technology-based effluent discharge requirements for flow-through and recirculating systems and for net pens based on Best Practicable Control Technology Currently Available (BPT); Best Control Technology for Conventional Pollutants (BCT); Best Available Technology Economically Achievable (BAT); and New Source Performance Standards (NSPS). The requirements, however, are only applicable to facilities that produce 100,000 pounds or more per year of aquatic animals. For facilities that do not meet this production threshold, such as the Livingston Stone National Fish Hatchery, technology-based effluent limitations are determined on a case-by-case basis using best professional judgment (BPJ) in accordance with 40 CFR 125.3.

The Regional Board adopted a *Water Quality Control Plan*, *Fourth Edition, for the Sacramento and San Joaquin River Basins* (hereafter Basin Plan). The Basin Plan designates beneficial uses, establishes water quality objectives, and describes an implementation program and policies to achieve water quality objectives for all waters of the Basin. This includes plans and policies adopted by the State Water Resources Control Board (SWRCB) and incorporated by reference, such as Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California" (Resolution No. 68-16). These requirements implement the Basin Plan. The Basin Plans, as amended, designate beneficial uses, establish water quality objectives, and contain implementation plans and policies for waters of the Basins. Pursuant to the California Water Code §13263(a), waste discharge requirements must implement the Basin Plans.

USEPA adopted the *National Toxics Rule* (NTR) on 22 December 1992, which was amended on 4 May 1995 and 9 November 1999, and the *California Toxics Rule* (CTR) on 18 May 2000, which was amended on 13 February 2001. These Rules contain water quality standards applicable to this discharge. The SWRCB adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy or SIP) on 2 March 2000, which contains policies and procedures for implementation of the NTR and the CTR.

The Sacramento River from Keswick Dam to Cottonwood Creek (approximately 15 miles), has been identified as a Water Quality Limited Segment under Section 303(d) of the Clean Water Act (CWA). The pollutants or stressors for which the Sacramento River is impaired appear on a list (the "California 303(d) List"), which was updated in 2002 and approved by the State Water Resources Control Board (SWRCB) in February 2003 and by USEPA in July 2003. The stressor identified on the California 303(d) List as impairing the Sacramento River from Keswick Dam to Cottonwood Creek is "unknown toxicity." The Livingston Stone National Fish Hatchery discharge occurs upstream of this impaired region of the Sacramento River. This Order includes effluent limitations that control the use of aquaculture drugs or chemicals that may contribute to toxic conditions in the Sacramento River.

Resolution No. 68-16 requires the Regional Board, in regulating discharges of waste, to maintain high quality waters of the State until it is demonstrated that any change in water quality will be consistent with the maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Board's policies (e.g., water quality constituents in concentrations that exceed water quality objectives). Resolution No. 68-16 requires that discharges be regulated to meet best practicable treatment or control in order to assure that pollution or nuisance will not occur; and the highest water quality be consistently maintained for the maximum benefit to the people of the State. The Board has considered Resolution No. 68-16 and Federal antidegradation regulations at 40 CFR 131.12 and compliance with these requirements will result in the use of best practicable treatment or control of the discharge. The impact on existing water quality will be insignificant.

Regulation of Aquaculture Drugs and Chemicals

CAAP facilities produce fish and other aquatic animals in greater numbers than natural stream conditions would allow; therefore, system management is important to ensure that fish do not become overly stressed, making them more susceptible to disease outbreaks. The periodic use of various aquaculture drugs and chemicals is needed to ensure the health and productivity of cultured aquatic stocks and to maintain production efficiency.

CAAP facilities may legally obtain and use aquaculture drugs in one of several ways. Some aquaculture drugs and chemicals used at CAAP facilities in the Region are approved by the U.S. Food and Drug Administration (FDA) for certain aquaculture uses on certain aquatic species. Others have an exemption from this approval process when used under certain specified conditions. Still others are not approved for use in aquaculture, but are considered to be of "low regulatory priority" by FDA (hereafter "LRP drug"). FDA is unlikely to take regulatory action related to the use of a LRP drug if an appropriate grade of the chemical or drug is used, good management practices are followed, and local environmental requirements are met (including NPDES permit requirements). Finally, some drugs and chemicals may be used for purposes, or in a manner not listed on their label (i.e., "extra-label" use) under the direction of licensed veterinarians for the treatment of specific fish diseases diagnosed by fish pathologists. It is assumed that veterinarian-prescribed aquaculture drugs

are used only for *short periods of duration* during acute disease outbreaks. Each of these methods of obtaining and using aquaculture drugs is discussed in further detail below.

It is the responsibility of those using, prescribing, or recommending the use of these products to know which aquaculture drugs and chemicals may be used in CAAP facilities in the Region under all applicable federal, State, and local regulations and which aquaculture drugs and chemicals may be discharged to waters of the United States and waters of the State in accordance with this permit. A summary of regulatory authorities related to aquaculture drugs and chemicals is outlined below.

Summary of Regulatory Authorities

FDA is responsible for ensuring the safety, wholesomeness, and proper labeling of food products; ensuring the safety and effectiveness of both human and animal drugs; and ensuring compliance with existing laws governing these drugs. The Federal Food, Drug, and Cosmetic Act (FFDCA), the basic food and drug law of the United States, includes provisions for regulating the manufacture, distribution, and the use of, among other things, new animal drugs and animal feed. FDA's enforcement activities include correction and prevention of violations, removing illegal products or goods from the market, and punishing offenders. Part of this enforcement includes testing domestic and imported aquacultural products for drug and pesticide residues.

FDA's Center for Veterinary Medicine (CVM) regulates the manufacture, distribution, and use of animal drugs. CVM is responsible for ensuring that drugs used in food-producing animals are safe and effective and that food products derived from treated animals are free from potentially harmful residues. CVM approves the use of new animal drugs based on data provided by a sponsor (usually a drug company). To be approved by CVM, an animal drug must be effective for the claim on the label) and safe when used as directed for (1) treated animals; (2) persons administering the treatment; (3) the environment, including non-target organisms; and (4) consumers. CVM establishes tolerances and animal withdrawal periods as needed for all drugs approved for use in food-producing animals. CVM has the authority to grant investigational new animal drug (INAD) exemptions so that data can be generated to support the approval of a new animal drug.

There are several options for CAAP facilities to legally obtain and use aquaculture drugs. Aquaculture drugs and chemicals can be divided into four categories as outlined below: approved drugs, investigational drugs, unapproved drugs of low regulatory priority, and extra-label use drugs.

- ***FDA approved new animal drugs***

Approved new animal drugs have been screened by the FDA to determine whether they cause significant adverse public health or environmental impacts when used in accordance with label instructions. Currently, there are six new animal drugs approved by FDA for use in food-producing aquatic species. These six FDA-approved new animal drugs are:

1. Chorionic gonadrotropin (Chlorulun®), used for spawning;
2. Oxytetracycline (Terramycin®), an antibiotic;
3. Sulfadimethoxine-ormetoprim (Romet-30®), an antibiotic;
4. Tricaine methanesulfonate (MS-222, Finquel® and Tricaine-S), an anesthetic;
5. Formalin (Formalin-F®, Paracide F® and PARASITE-S®), used as a fungus and parasite treatment; and
6. Sulfamerazine, an antibiotic.

Each aquaculture drug in this category is approved by FDA for use on specific fish species, for specific disease conditions, for specific dosages, and with specific withdrawal times. Product withdrawal times must be observed to ensure that any product used on aquatic animals at a CAAP facility does not exceed legal tolerance levels in the animal tissue. Observance of the proper withdrawal time helps ensure that products reaching consumers are safe and wholesome.

FDA-approved new animal drugs that are added to aquaculture feed must be specifically approved for use in aquaculture feed. Drugs approved by FDA for use in feed must be found safe and effective. Approved new animal drugs may be mixed in feed for uses and at levels that are specified in FDA medicated-feed regulations only. It is unlawful to add drugs to feed unless the drugs are approved for feed use. For example, producers may not top-dress feed with a water-soluble, over-the-counter antibiotic product. Some medicated feeds, such as Romet-30®, may be manufactured only after the FDA has approved a medicated-feed application (FDA Form 1900) submitted by the feed manufacturer.

- ***FDA Investigational New Animal Drugs (INAD)***

Aquaculture drugs in this category can only be used under an investigational new animal drug or "INAD" exemption. INAD exemptions are granted by FDA CVM to permit the purchase, shipment and use of an unapproved new animal drug for investigational purposes. INAD exemptions are granted by FDA CVM with the expectation that meaningful data will be generated to support the approval of a new animal drug by FDA in the future. Numerous FDA requirements must be met for the establishment and maintenance of aquaculture INADs.

There are two types of INADs: standard and compassionate. Aquaculture INADs, most of which are compassionate, consist of two types: routine and emergency. A compassionate INAD exemption is used in cases in which the aquatic animal's health is of primary concern. In certain situations, producers can use unapproved drugs for clinical investigations (under a compassionate INAD exemption) subject to FDA approval. In these cases, CAAP facilities are used to conduct closely monitored clinical field trials. FDA reviews test protocols, authorizes specific conditions of use, and closely monitors any drug use under an INAD exemption. An application to renew an INAD exemption is required each year. Data recording and reporting are required under the INAD exemption in order to support the approval of a new animal drug or an extension of approval for new uses of the drug.

- ***FDA Unapproved new animal drugs of low regulatory priority (LRP drugs)***

LRP drugs do not require a new animal drug application (NADA) or INAD exemptions from FDA. Further regulatory action is unlikely to be taken by FDA on LRP drugs as long as an appropriate grade of the drug or chemical is used, good management practices are followed, and local environmental requirements are met (such as NPDES permit requirements contained in this Permit). LRP drugs commonly used at CAAP facilities in the Region include the following:

1. Acetic acid, used as a dip at a concentration of 1,000-2,000 mg/L for 1-10 minutes as a parasiticide for fish.
2. Carbon dioxide gas, used for anesthetic purposes in cold, cool and warm water fish.
3. Hydrogen peroxide, used at 250-500 mg/L to control fungi on all species and life stages of fish, including eggs.
4. Povidone iodine (PVP) compounds, used as a fish egg disinfectant at rates of 50 mg/L for 30 minutes during egg hardening and 100 mg/L solution for 10 minutes after water hardening.
5. Sodium bicarbonate (baking soda), used at 142-642 mg/L for 5 minutes as a means of introducing carbon dioxide into the water to anesthetize fish.
6. Sodium chloride (salt), used at 0.5-1% solution for an indefinite period as an osmoregulatory aid for the relief of stress and prevention of shock. Used as 3% solution for 10-30 minutes as a parasiticide.

FDA is unlikely to object at present to the use of these LRP drugs if the following conditions are met:

1. The aquaculture drugs are used for the prescribed indications, including species and life stages where specified.
2. The aquaculture drugs are used at the prescribed dosages (as listed above).
3. The aquaculture drugs are used according to good management practices.
4. The product is of an appropriate grade for use in food animals.
5. An adverse effect on the environment is unlikely.

FDA's enforcement position on the use of these substances should be considered neither an approval nor an affirmation of their safety and effectiveness. Based on information available in the future, FDA may take a different position on their use. In addition, FDA notes that classification of substances as new animal drugs of LRP does not exempt CAAP facilities from complying with all other federal, state and local environmental requirements, including compliance with this Permit

- ***Extra-label use of an approved new animal drug***

Extra-label drug use is the actual or intended use of an approved new animal drug in a manner that is not in accordance with the approved label directions. This includes, but is not limited to, use on species or for indications not listed on the label. Only a licensed veterinarian may prescribe extra-label drugs under FDA CVM's extra-label drug use policy. CVM's extra-label use drug policy

(CVM Compliance Policy Guide 7125.06) states that licensed veterinarians may consider extra-label drug use in treating food-producing animals if the health of the animals is immediately threatened and if further suffering or death would result from failure to treat the affected animals. CVM's extra-label drug use policy does not allow the use of drugs to prevent diseases (prophylactic use), improve growth rates, or enhance reproduction or fertility. Spawning hormones cannot be used under the extra-label policy. In addition, the veterinarian assumes the responsibility for drug safety and efficacy and for potential residues in the aquatic animals.

RECEIVING WATER BENEFICIAL USES

The existing beneficial uses of the Sacramento River, from Shasta Dam to Colusa Basin Drain as identified in Table II-1 of the Basin Plan include: municipal and domestic supply (MUN); agricultural supply (AGR) including both irrigation and stock watering; industrial service supply (IND); hydropower generation (POW); body contact recreation, canoeing and rafting, (REC-1); and other non-body contact recreation (REC-2); warm freshwater aquatic habitat (WARM); cold freshwater aquatic habitat (COLD); migration of aquatic organisms (MIGR) both warm and cold habitats, warm and cold habitat spawning, reproduction, and/or early development (SPWN); wildlife habitat (WILD); and navigation (NAV).

Beneficial uses of the underlying groundwater are municipal and domestic supply (MUN), industrial service supply (IND), industrial process supply (PRO) and agricultural supply irrigation (AGR).

REASONABLE POTENTIAL ANALYSIS AND EFFLUENT LIMITATIONS

Federal regulations at 40 CFR Section 122.44 require NPDES permits to contain effluent limitations, including technology-based and water quality standards-based limitations and limitations based on toxicity.

Federal regulations at 40 CFR 122.44(d)(1) require effluent limitations for all pollutants that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an in-stream excursion above a numeric water quality criterion (such as CTR criterion) or a narrative water quality criterion within a State water quality standard. These regulations also set forth a methodology for establishing effluent limitations based on narrative state water quality criteria [40 CFR 122.44(d)(1)(vi)(A-C)].

The USEPA, SWRCB, and Regional Board have adopted or published standards that are used to implement 40 CFR 122.44. USEPA has promulgated the CTR and NTR that established water quality criteria. The SWRCB has adopted the SIP that implements the CTR and NTR. USEPA also has published recommended ambient water quality criteria and the Basin Plan contains numeric and narrative water quality objectives. The Basin Plan contains an Implementation Policy ("Policy for Application of Water Quality Objectives") that, in part, sets forth a process for translating narrative water quality objectives into numeric effluent limitations. USEPA ambient water quality criteria, results of toxicity studies conducted by the California Department of Fish and Game, and the Basin

Plan "Policy of Application of Water Quality Objectives" have been used to implement 40 CFR 122.44(d)(1)(v).

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs, the Regional Board determined that numeric technology-based effluent limitations for total suspended solids (TSS) and settleable solids are appropriate.

Total Suspended Solids and Settleable Solids

As noted above, the requirements in USEPA's final ELG for the aquaculture industry do not apply to facilities that produce less than 100,000 pounds per year of aquatic animals. Order No. 98-031 established effluent limitations for TSS of 5 mg/L (net) and 15 mg/L (net) as a monthly average and daily maximum, respectively based on BPJ in accordance with 40 CFR 125.3. In addition, the Order established effluent limitations for settleable solids of 0.1 ml/L and 0.2 mL/L as a monthly average and maximum daily, respectively, based on BPJ. The Regional Board has determined that these numeric effluent limitations for TSS and settleable solids continue to be applicable to the Facility and, therefore, the limitations have been carried over to this Order.

Relationship Between Technology-based and Water Quality-based Requirements

In addition to carrying over numeric technology-based requirements based on BPJ, the Regional Board also considered the need for water quality-based limitations for TSS and settleable solids. As the previous Order, the Regional Board determined that the technology-based limitations for TSS and settleable solids, along with the requirement for a BMP plan, are sufficient to ensure attainment of Basin Plan water quality objectives for sediment, settleable material, and suspended material.

WATER QUALITY-BASED EFFLUENT LIMITATIONS

Results of routine effluent monitoring conducted by the Discharger, a special study of CTR constituents (described below), and information from the Discharger regarding use of aquaculture drugs and chemicals indicate the discharge has the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numeric water quality standard for pH, formaldehyde, and malachite green. There was no reasonable potential to cause or contribute to an in-stream excursion of any CTR criteria. As required by 40 CFR Part 122.44 (d)(1)(i)-(iii), this Order includes effluent limitations for pH, formaldehyde, and malachite green.

Effluent limitations are being established without benefit of dilution. The Regional Board is not obligated to delegate the assimilative capacity of receiving waters to a Discharger. Further, formaldehyde limitations are based protection of aquatic life from acute effects. Therefore, it is appropriate calculate effluent limitations with no dilution allowance.

CTR Constituents

On 11 December 2000 the Regional Board issued a letter pursuant to Section 13267 of the California Water Code (CWC) requiring all NPDES Dischargers to conduct effluent and receiving water monitoring and submit results of this monitoring in accordance with a time schedule provided in the letter. The Discharger conducted a study to determine whether levels of NTR, CTR, or other pollutants in the discharge have the reasonable potential to cause or contribute to an in-stream excursion above a numeric or narrative water quality standard, including Basin Plan numeric or narrative objectives and CTR/NTR criteria. Results of this study were submitted to the Regional Board for samples taken from Outfall 001, Outfall 002, and the receiving water on 17 May 2001. Additional sampling for dioxins was conducted on 17 January 2002. None of the priority pollutants were detected at concentrations that would cause or contribute to an in-stream excursion above a water quality objective. The effluent sample collected was representative of typical operating conditions. Copper is not used at the Facility and will not be used in the future. Based on CTR results and Facility operations, the Regional Board finds that the discharge does not have a reasonable potential to cause or contribute to an in-stream excursion above the CTR objectives for priority pollutants. Effluent limitations for priority pollutants have not been included in this Order.

Non-CTR Constituents

pH

The Basin Plan contains water quality objectives for pH in the form of a range of acceptable pH values (measured in standard units). In the previous Order, the Regional Board established effluent limitations in the form of an acceptable range of pH between 6.5 and 8.5 standard units for discharges to the Sacramento River. Based on recent self-monitoring reports, the discharge has exceeded the upper end of this range at Outfall 001, Outfall 002A, and Outfall 002B and the lower end of the range at Outfall 001 and Outfall 002A. Monitoring data indicates the source water from Shasta Lake may occasionally be less than 6.5 or greater than 8.5. This Order includes an acceptable range of pH in the discharge between 6.0 and 9.0 standard units. Based on the volume of the Facility discharge and receiving water flow, the discharge will not cause a pH fluctuation in the receiving water to alter ambient pH.

Aquaculture Drugs and Chemicals

Numeric water quality criteria, or Basin Plan numeric objectives currently are not available for most of the aquaculture drugs and chemicals used by the Discharger or proposed for use at this facility. Therefore, the Regional Board used the narrative water quality objective for toxicity from the Basin Plan and applied the Policy for "Application of Water Quality Objectives" as a basis for determining "reasonable potential" for discharges of these drugs and chemicals. This objective states, in part: "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." The Basin Plan states that compliance with this objective will be determined by several factors, including biotoxicity tests of

appropriate duration, or other analytical methods as specified by the Regional Board. (Biotoxicity testing involves measuring the toxic effects of an effluent on specified organisms according to nationally approved protocols). USEPA's TSD specifies two toxicity measurement techniques that can be employed in effluent characterization; the first is Whole Effluent Toxicity (WET) testing, and the second is chemical-specific toxicity analyses. WET testing is used most appropriately when the toxic constituents in an effluent are not completely known; whereas chemical-specific analysis is more appropriately used when an effluent contains only one, or very few, well-known constituents. Due to the nature of operations and chemical treatments at most CAAP facilities in the Region, CAAP facility effluents generally contain only one or two known chemicals at any given a time. Therefore, the Regional Board is using a chemical-specific approach to determine "reasonable potential" for discharges of aquaculture drugs and chemicals from CAAP facilities. The California Department of Fish and Game Pesticide Investigation Unit (DFG Pesticide Unit) has initiated biotoxicity studies to determine the aquatic toxicity of certain aquaculture drugs and chemicals commonly used at their CAAP facilities in the Region. The results of these studies are, in part, used to determine reasonable potential for aquaculture drugs and chemicals for this Facility.

Formalin as Formaldehyde

A 37 percent formaldehyde solution (formalin) is used at hatcheries as a fungicide treatment on fish eggs and on fish in the raceways. Formalin (also known by the trade names Formalin-F®, Paracide-F®, PARASITE-S®) is approved through FDA's New Animal Drug Application (NADA) program for use in controlling external protozoa and monogenetic trematodes on fish, and for controlling fungi of the family *Saprolegniacae* in food-producing aquatic species (including trout and salmon). For control of other fungi, formalin may be used under an Investigational New Animal Drug (INAD) exemption. Formalin typically is used as a "drip" treatment to control fungus on fish eggs at a concentration of 1,000 to 2,000 mg/L for 15 minutes, or as a "flush" treatment in raceways of at a concentration of 170 to 250 mg/L for 1-hour. The Discharger uses formalin from May through September to treat eggs for fungus infections at a rate of 1,400 mg/L for 15 minutes. The treatment is conducted two times per week, but may be used up to five times per week if needed. Water from the incubator stack where formalin is used is captured in a trough, pumped through the GAC filters, and discharged via Outfall 001. During normal operations, water from the incubator trough is discharged through Outfall 001 at a rate of 6 to 60 gallons per minute. The estimated minimum flow through Outfall 001 during this period is 200 gallons per minute. The average flow is 300 gallons per minute and the maximum is 500 gallons per minute. At the typical usage rate of 1,400 mg/L formalin and the maximum flow of 60 gallons per minute through the incubator trough, and the maximum flow of 500 gallons per minute from Outfall 001, the estimated maximum calculated concentration of in the discharge from Outfall 001, assuming no removal of formaldehyde, would be 168 mg/L formalin (62 mg/L as formaldehyde).

(60 gpm / 500 gpm) X 1400 mg/L = 168 mg/L formalin X 0.37 = 62 mg/L formaldehyde

As noted, however, the Discharger captures flow from the incubator trays and pumps it through the GAC filters. Monitoring results show that formaldehyde concentrations at Outfall 001 routinely are

less than the reportable limit of 20 µg/L, though a sample from 22 June 1999 shows a concentration of 1200 µg/L (1.2 mg/L).

Based on the results of the toxicity tests and estimates of potential discharges of formaldehyde from the facility, formaldehyde may be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of the narrative water quality objective for toxicity from the Basin Plan. Accordingly, this Order includes water quality-based effluent limitations for formaldehyde. Effluent concentrations of formaldehyde may persist because of potential application procedures (e.g., repeated drip treatments for eggs). The previous Order No. 98-031 for the Facility included a less stringent daily maximum limitation of 0.03 mg/L. There is no information in the previous Order or fact sheet to support the 0.03 mg/L limit and Regional Board staff have not found information supporting the limit. There is no USEPA or California MCL for formaldehyde. Based on the new information from DFG toxicity tests, the lack of an MCL to adequately interpret chemical objectives from the Basin Plan, and to maintain consistency with permit requirements for similar CAAP facilities in the Region, the Regional Board has determined that it is appropriate to revise the formaldehyde limitations in this Order.

The Basin Plan contains a narrative water quality objective for toxicity that states in part that "[a]*ll waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*" (narrative toxicity objective). Aquatic habitat is a beneficial use of the Sacramento River. The DFG Pesticide Unit conducted biotoxicity studies to determine the aquatic toxicity of formaldehyde using *Pimephales promelas,* and *Ceriodaphnia dubia* (*C. dubia*) in accordance with the analytical methods specified in EPA600/4-91-002, *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*. These "short-term chronic tests" measure effects such as reduced growth of the organism, reduced reproduction rates, or lethality. Results were reported as a No Observed Effect Concentration (NOEC) and a Lowest Observed Effect Concentration (LOEC). The DFG Pesticide Unit also conducted acute toxicity tests using *C. dubia* in accordance with methods specified in EPA600/4-90/027, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.* Acute toxicity test results typically are reported as the No Observed Adverse Effect Level (NOAEL), Lowest Observed Adverse Effect Level (LOAEL), and Lethal Concentration at 50 percent mortality (LC_{50}).

Results of chronic toxicity tests submitted by the DFG Pesticide Unit indicated *C. dubia* was the most sensitive species with a 7-day NOEC value of 1.3 mg/L formaldehyde for survival and reproduction. Acute toxicity tests with *C. dubia* showed a 96-hour NOAEL of 1.3 mg/L. A summary of the data submitted follows:

Species	7-day LC50 (mg/L)	LOEC (mg/L)	NOEC (mg/L)	LOAEL (mg/L)	NOAEL (mg/L)
C. dubia	2.4	5.8[1] 1.3[2]	1.3[1] <1.3[2]	5.8	1.3
Pimephales promelas	23.3	9.09	2.28	--	--
Selenastrum capricornutum	<5.2	--	--	--	--

[1] Survival
[2] Reproduction

Since formalin treatments are utilized as a batch or flush treatment which result in discharges from three to eight hours, short-term tests were conducted with *C. dubia*, exposing the organisms for 2-hour and 8-hour periods, removing them from the chemical, and continuing the observation period for 7 days in clean water. The results were as follows:

Species	7-day LC50 (mg/L)	LOAEL (mg/L)	NOAEL (mg/L)
C. dubia—2-hour exposure	73.65	46.3	20.7
C. dubia—8-hour exposure	13.99	15.3	6.7

The Regional Board considered the results of both acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit when determining whether water quality-based effluent limits for formalin as formaldehyde were necessary. Results of chronic toxicity tests indicated *C. dubia* was the most sensitive species, with a 7-day NOEC value of 1.3 mg/L formaldehyde for survival and less than 1.3 mg/L for reproduction. Acute toxicity tests conducted using *C. dubia* showed a 96-hour NOAEL of 1.3 mg/L formaldehyde. Additional acute toxicity tests were conducted using an 8-hour exposure resulting in a 96-hour NOAEL concentration of 6.7 mg/L formaldehyde.

The Regional Board used USEPA's TSD guidance to calculate the MDEL and AMEL effluent limitations for formaldehyde as follows:

Assuming:

- No in-stream dilution allowance.
- Coefficient of Variation (CV) = 0.6 for the lognormal distribution of pollutant concentrations in effluent.

Effluent Concentration Allowance based on NOAEL (acute toxicity) with no dilution allowance

ECA_a = 1.3 mg/L

Effluent Concentration Allowance based on NOEC (chronic toxicity) with no dilution allowance

ECA_c = 1.3 mg/L

Long Term Average concentration based on acute ECA

LTA_a = 1.3 mg/L X 0.321 = 0.42 mg/L
(where 0.321 = acute ECA multiplier at 99% occurrence probability and 99% confidence)

Long Term Average concentration based on chronic ECA

LTA_c = 1.3 mg/L X 0.527 = 0.69 mg/L
(where 0.527 = chronic ECA multiplier at 99% occurrence probability and 99% confidence)

Most Limiting LTA concentration

LTA = 0.4173 mg/L

Average Monthly Effluent Limit

AMEL = LTA x 1.55
(where 1.55 = AMEL multiplier at 95% occurrence probability, 99% confidence, and n = 4)

AMEL = 0.42 mg/L X 1.55 = **0.65 mg/L as formaldehyde**

Maximum Daily Effluent Limit

MDEL = LTA x 3.11
(where 3.11 = MDEL multiplier at 99% occurrence probability and 99% confidence)

MDEL = 0.42 mg/L X 3.11 = **1.3 mg/L as formaldehyde**

Sodium Chloride

The Discharger reports that sodium chloride (salt) is used at the Facility at a rate of up to 150 lbs per 30 minute static bath in the in the large brood stock tanks and 15 pounds inside the hatchery building. Sodium chloride is used as a stress reducer, osmoregulatory enhancer, and as a treatment for fish lice. The Discharger reports that the treatment level for fish lice is set at 3% (30,000 mg/L) in a static bath. Based on flow estimates provided in the USEPA "Detailed Questionnaire for the Aquatic Animal Production Industry" from April 2002, the average flow through the brood stock tanks at 50 gallons per minute (72,000 gpd) per tank. Assuming a maximum flow from Outfall 002 of 2.45 mgd, the

estimated concentration of sodium chloride from Outfall 002 would be approximately 880 mg/L sodium chloride following the 30 minute treatment of one tank.

(72,000 gpd / 2,450,000 gpd) X 30,000 mg/L = 880 mg/L sodium chloride

FDA considers sodium chloride an unapproved new animal drug of low regulatory priority (LRP drug) for use in aquaculture. Consequently, FDA is unlikely to take regulatory action if an appropriate grade is used, good management practices are followed, and local environmental requirements are met. There are no numeric water quality objectives for conductivity, TDS, or chloride in the NTR, CTR, or Basin Plan for the Sacramento River. The Basin Plan does contain a narrative objective for chemical constituents that states, in part, "Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses." Agricultural irrigation is a beneficial use of the receiving water. *Water Quality for Agriculture, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1* (R.S. Ayers and D.W. Westcot, Rome, 1985), recommends that the conductivity level in waters used for agricultural irrigation not exceed 700 µmhos/cm (Agricultural Water Quality Goal) because it will reduce crop yield for sensitive plants. The Agricultural Water Quality Goal for TDS is 450 mg/L. USEPA's recommended ambient water quality criteria for chloride for the protection of freshwater aquatic life are 230 mg/L as a one-hour average, and 860 mg/L as a four-day average. The Agricultural Water Quality Goal for chloride is 106 mg/L. The discharge of sodium chloride from the Facility at the application rates described by the Discharger will not cause, have the reasonable potential to cause, or contribute to an in-stream excursion of applicable water quality criteria or objectives. Monitoring of conductivity and chloride is required and monthly use of sodium chloride must be reported as specified in the Monitoring and Reporting Program.

Malachite Green

The Discharger uses malachite green under an INAD exemption for the "Use of Unapproved Drugs on Threatened or Endangered Fish Species." Fish in the wild brood tanks may be treated up to five times weekly in a one-hour static bath at 1.0 mg/L. The tanks are pumped through the GAC filters for four hours, then returned to normal operation. Water from the GAC filters is discharged via Outfall 001. The previous Order required that water to which malachite green was added be treated by GAC filters and that the effluent discharged *from the filters* not exceed a concentration of 10 µg/L malachite green (also the reporting limit). The concentration of malachite green in effluent discharged from the GAC filters has consistently been below the reporting limit of 10 µg/L. The Discharger reports that the GAC filters were regenerated in late 2003. Based on this information, the Regional Board is retaining the effluent limitation of 10 µg/L for malachite green and the requirement that water to which malachite green has been added be treated by GAC filters, but is applying the effluent limitation at Outfall 001 rather than after the GAC filters. This Order retains requirements for monitoring malachite green concentration in effluent from the GAC filters, but reduces monitoring frequency at this internal monitoring point.

PVP Iodine

PVP Iodine, a solution composed of 10% PVP Iodine Complex and 90% inert ingredients. FDA considers PVP Iodine an LRP drug for use in aquaculture. PVP Iodine is used at the Facility as a fish egg disinfectant (fungicide) at a treatment level of 100 mg/L for a 10 minute static bath (90 ml PVP Iodine per 2.4 gallons of water). The estimated flow through a single incubator stack is 6 gpm. The water from the incubator trough, which collects flows from the incubator stack, is discharged through Outfall 001 at a rate of 6-60 gpm. The total discharge through Outfall 001 is, at a minimum, 200 gpm. At a flow rate of 6 gpm of water with a concentration of 100 mg/L PVP Iodine Complex through the incubator stack and trough and the minimum flow rate of 200 gpm from Outfall 001, the estimated discharge of PVP Iodine Complex at Outfall 001 is 3 mg/L.

(6 gpm / 200 gpm) X 100 mg/L = 3 mg/L PVP Iodine Complex

Results of a single acute toxicity test with *C. dubia* conducted by DFG showed a 96-hour NOAEL of 0.86 mg/L. The estimated discharge concentration of PVP Iodine Complex exceeds the 96-hour NOAEL value. However, since there is limited toxicity information available at this time on short term exposures and no information regarding actual discharge concentrations of PVP Iodine, this Order does not include water quality-based effluent limitations for PVP Iodine. Use and monitoring of PVP Iodine must be reported as specified in the attached Monitoring and Reporting Program. Additional short term toxicity tests using PVP Iodine will be required as specified in Provision No. 7. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Chloramine-T

Chloramine-T is used in accordance with an INAD exemption for "Use of Unapproved Drugs on Threatened and Endangered Species." Chloramine-T breaks down into para-toluenesulfonamide (p-TSA) and, unlike other chlorine-based disinfectants, does not form harmful chlorinated compounds. It is used only sporadically at the Facility to treat Bacterial Gill Disease in juvenile fish at a treatment level of 15 mg/L for a 30 minute static bath in the fry circular tanks. Assuming 6 of the 60 fry circular tanks are treated at one time, the discharge from the fry circular tanks to Outfall 001 would have an estimated concentration of chloramine-T of 1.5 mg/L. This concentration would be further diluted from additional flow to Outfall 001. Assuming that 2 of the 30 rectangular fry tanks are treated at one time, estimated concentration of chloramine-T in the discharge from the rectangular fry tanks to Outfall 002 would be 1.0 mg/L. This concentration would be diluted by additional flow to Outfall 002.

DFG has not conducted biotoxicity tests using chloramine-T, however results of toxicity testing from other sources show a 96-hour LC_{50} for rainbow trout of 2.8 mg/L and a 48-hour NOEC for *Daphnia magna* of 1.8 mg/L. The DFG Pesticide Unit is proposing to conduct additional toxicity testing on chloramine-T to determine NOAEL concentrations. Since there is limited toxicity information

available and no information regarding actual discharge concentrations of Chloramine-T, this Order does not include water quality-based effluent limitations for Chloramine-T. However, use and monitoring of Chloramine-T must be reported as specified in the attached Monitoring and Reporting Program. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

MS-222

The Discharger uses the anesthetic Tricaine methanesulfonate, commonly known as MS-222 (with trade names of Finquel® or Tricaine-S®). MS-222 has been approved by FDA for use as an anesthetic for Salmonidae. It is intended for the temporary immobilization of fish, amphibians and other aquatic, cold-blooded animals. It has been recognized as a valuable tool for the proper handling of these animals during manual spawning (fish stripping), weighing, measuring, marking, surgical operations, transport, photography, and research. The Regional Board does not have specific toxicity information for MS-222 or estimates of potential discharge concentrations of MS-222 at this Facility. Since there is limited toxicity information available at this time and no information regarding actual discharge concentrations of MS-222 this Order does not include water quality-based effluent limitations for MS-222. However, use and monitoring of MS-222 must be reported as specified in the attached Monitoring and Reporting Program. Furthermore, DFG is planning to conduct toxicity tests using MS-222. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Carbon Dioxide

Carbon dioxide gas is used to anesthetize fish. FDA considers carbon dioxide an LRP drug for use in aquaculture. Based upon available information regarding the use of these substances at this Facility and other CAAP facilities in the Region, the Regional Board does not believe that carbon dioxide gas will be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this Order does not include water quality-based effluent limitations for carbon dioxide however, use of this substance must be reported as specified in the attached Monitoring and Reporting Program. In the future, as additional information becomes available regarding the use of carbon dioxide gas, the Regional Board will re-evaluate whether the discharge of this substance to receiving waters may cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan objectives and, if necessary, re-open this Order to include numeric effluent limitations.

Pond PolyAqua

The discharger uses Pond PolyAqua, a professional water conditioner, in the anesthesia bath and to fish distribution tanks to reduce stress and aid in reducing handling damage. It is used at a concentration of 130 mg/L for an indefinite amount of time and may be discharged via Outfall 002.

PolyAqua is not known to be toxic or to reach toxic levels with regular use or overdosing. Based on available information, the Regional Board believes that PolyAqua, when used according to label instructions, will not be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this Order does not include water quality-based effluent limitations for this substance; however, use of PolyAqua must be reported as specified in the attached Monitoring and Reporting Program. In the future, as additional information becomes available regarding the use or toxicity of this substance, the Regional Board will re-evaluate whether its discharge to receiving waters may cause, have the reasonable potential to cause, or contribute to an excursion of the Basin Plan objectives for toxicity and, if necessary, re-open this Order to include numeric effluent limitations.

Vibrio Vaccine

The Discharger uses a vibrio vaccine as an immersion for brood stock destined for saltwater rearing at Bodega Bay Marine Lab. The vaccine helps protect salmonid species from vibriosis disease caused by Vibrio anguillarum serotype I and Vibrio ordalii. Vibrio vaccine stimulates the fish's immune system to produce protective antibodies, helping the animal defend itself against vibriosis. This veterinary biologic is licensed for use by the US Department of Agriculture's (USDA's) Center for Veterinary Biologics. Veterinarians should be consulted before beginning an immunization program. According to USDA, most biologics leave no chemical residues in animals and most disease organisms do not develop resistance to the immune response by a veterinary biologic. Currently, the Facility is not discharging vibrio vaccine to surface waters. However, based upon available information regarding the use of these substances at CAAP facilities, the Regional Board believes that vibrio vaccine, when used according to label and veterinarian instructions, would not be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this Order does not include water quality-based effluent limitations for this substance; however, use of vibrio vaccine must be reported as specified in the attached Monitoring and Reporting Program. In the future, as additional information becomes available regarding the use or toxicity of vibrio vaccine, the Regional Board will re-evaluate whether its discharge to receiving waters may cause, have the reasonable potential to cause, or contribute to an excursion of the Basin Plan objective for toxicity and, if necessary, re-open this Order to include numeric effluent limitations.

Oxytetracycline

Terramycin 100D (Oxytetracyline), is an antibiotic approved through FDA's NADA program for use in controlling ulcer disease, furunculosis, bacterial hemorrhagic septicemia, and pseudomonas disease. It is used for a period of 10 days at the rate of 3.75 grams per 100 lbs of fish as a feed additive. However, oxytetracycline may also be used as an extra-label use under a veterinarian's prescription in an immersion bath of approximately six to eight hours in duration. The Regional Board has considered the results of acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit when determining whether water quality-based effluent limits for oxytetracycline were necessary in this Permit. Results of acute toxicity tests using *C. dubia* showed a 96-hour NOAEL of 40.4 mg/L. Results

of chronic toxicity tests using *C. dubia* showed a 7-day NOEC for reproduction of 48 mg/L. The information available to the Regional Board regarding discharges of oxytetracycline indicates that it is discharged at levels well below the lowest NOEC and NOAEL. Therefore, at this time, the Regional Board determined that oxytetracycline, when used in feed or in an immersion bath treatment, is not discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plans. Accordingly, this Permit does not include an effluent limitation for oxytetracycline. However, monthly use of oxytetracycline must be reported as specified in the attached Monitoring and Reporting Program. The Regional Board will review this information, and other information as it becomes available, and this permit may be reopened to establish effluent limits based on additional use and toxicity information.

SLICE and Invermectin

SLICE (Emamectin benzoate) and Ivermectin are two chemicals that may be used starting in 2006 as part of a study to look at chemicals that are effective in the control of sea lice (copepods). The study will use nine large circular tanks with three tanks with three tanks using each chemical and three tanks a control. Slice would be mixed in feed and fed at a rate of 50 ug per kilogram of fish for seven days. Invermectin (used for heartworm in dogs) would be veterinarian prescribed. The fish would be oral incubated (force down into stomach) at a rate of 0.2 mg active ingredient per kilogram of fish.

Injected Drugs – Erythromycin, Liquamycin LA-200, and LHRH

Erythromycin (injected) is a veterinarian-prescribed drug used at the Facility to control Bacterial Kidney Disease. It is injected into adult salmon at a target dosage of 20 mg/kg. Fish receive one to four injections with at least fourteen days between them. Liquamycin LA-200 (Oxytetracyline) is a veterinarian prescribed drug for the control of gram positive bacterial infections. It would be injected at the rate of 20-40 mg per kilogram of fish. Luteinizing Hormone – Releasing Hormone analogue (LHRH) is used under an INAD exemption for "Use of Unapproved Drugs on Threatened or Endangered Fish Species." LHRH is administered to accelerate final gamete maturation in fish that have undergone gametogenesis. Implants are injected under the dorsal muscle tissue below the dorsal fin above the lateral line by use of a Ralgro Pellet Injector. The target dosage is 100 μg/kg.

In the NPDES General Permit for Aquaculture Facilities in Idaho (Idaho General Permit), USEPA Region 10 distinguishes between antibiotics applied in feed formulations and antibiotics applied in immersion baths. The Idaho General Permit concludes that drugs or chemicals administered via feed, and ingested by fish, pose little threat to aquatic life or beneficial uses because a majority of the drug is utilized by the fish, though some literature suggests otherwise. As stated in the Idaho General Permit, "USEPA believes that disease control drugs and other chemicals provided for ingestion by fish do not pose a risk of harm or degradation to aquatic life or other beneficial uses." Based on similar conclusions as those drawn by USEPA for the Idaho General Permit, the Regional Board has determined that injected drugs such as erythromycin, Liquamycin LA-200**,** and LHRH are used in a manner that reduces the likelihood of direct discharge to waters of the United States or waters of the State. Only trace amounts of these drugs may leak out through injection points. Therefore, these

drugs are not likely to be discharged from the Facility at levels that would cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this Order does not include water quality-based effluent limitations for these substances; however, it does require reporting use as specified in the attached Monitoring and Reporting Program.

Drugs for Cryopreservation and Activation of Sperm

The Facility uses glucose, dimethyl sulfoxide, chicken egg yolk, sodium chloride, trizma base buffer, glycine, and theophylline in the cryopreservation of sperm and as sperm activators. They are not discharged to surface waters, though trace amounts may remain on the eggs when they are placed in the incubator stacks, which flow to Outfall 001. Based on available information regarding disposal of these substances and the lack of potential for discharge, the Regional Board does not believe that they will be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this Order does not include water quality-based effluent limitations for these drugs; however, their use must be reported as specified in the attached Monitoring and Reporting Program.

BASIS FOR WASTE DISPOSAL PROVISIONS

Solid waste disposal provisions in this Permit are based on the requirements of CCR Title 27 and prevention of unauthorized discharge of solid wastes into waters of the United States or waters of the State.

BASIS FOR BEST MANAGEMENT PRACTICES PROVISIONS

Best Management Practices plan requirements are established based on 40 CFR 122.44(k)(4) to help ensure adequate control of solids and other pollutants present in the discharge.

BASIS FOR RECEIVING WATER LIMITATIONS

Receiving water limitations are interpretations of water quality objectives from the Basin Plan. Receiving water limitations in this Permit are included to ensure protection of beneficial uses of receiving waters. A receiving water condition not in conformance with a limitation is not necessarily a violation of the Permit. However, the Regional Board may require an investigation to determine cause and culpability prior to asserting that a violation has occurred.

MONITORING AND REPORTING PROGRAM

Receiving water monitoring requirements are based on the Basin Plan and authorized by California Water Code Section 13383. Receiving water monitoring requirements are standard requirements in almost all NPDES permits issued by the Regional Board.